

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of:

Takashi HAYASHIHARA et al.

Serial No. 09/977,248

Group Art Unit: Unassigned

Confirmation No. 2244

Filed: October 16, 2001

Examiner: Unassigned

FOR: FRONT AND REAR ADJUSTABLE PEDALING DEVICE ALSO USABLE TO  
AUTOMOBILE

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Before examination of the above-identified application, please amend the application as follows:

**IN THE ABSTRACT:**

Please DELETE the Abstract in its entirety and substitute a new Abstract as follows:

A vehicle pedal device including: a depressable portion which is to be operationally depressed by a driver of the vehicle; an output member which is pivotably supported by a supporting shaft provided in a bracket that is fixed to a body of the vehicle, such that the output member is pivoted about the supporting shaft when the depressable portion is operationally depressed, for thereby applying to a motive-power transmitting member an output corresponding to a depression force which is applied to the depressable portion; a longitudinal adjustment device which moves the depressable portion in a longitudinal direction of the body of the vehicle when the depressable portion is not being operationally depressed; and a pedal-ratio varying mechanism which is disposed between the output member and the motive-power transmitting member, and which is capable of adjusting a pedal ratio of the pedal device.

**IN THE SPECIFICATION:**

Please REPLACE paragraph [0028] with the following new paragraph:

**[0028]** The above-described pedal ratio is a ratio at which the depression force is multiplied to press the rod 24, or a ratio of the depression amount required for pressing the rod 24 by a certain amount. The pedal ratio can be expressed by the following expression in which a dimension of each part indicated in Fig. 1 is used. In the expression, R represents the pedal ratio; the dimension  $L_p$  represents an arm length of the pedal member 34; the dimensions  $M_1$ ,  $M_2$  represent respective arm lengths of the output member 28 and the pivot lever 62 which are measured from the connecting link 60 as a reference; the dimension  $L_H$  represents an arm length from the attaching shaft 64 of the pivot lever 62 to a center line S at which the rod 24 is pressed into the brake booster; and the angle  $\theta$  represents an angle by which the rod 24 is inclined with respect to the center line S. Fig. 3 is one example of the characteristic of the pedal ratio R, which is obtained in accordance with the expression while the depressing stroke of the depressable portion 20, i.e., the position of the pedal member 34 about the connecting shaft 32 is successively changed. In this example of the characteristic of the pedal ratio R, the pedal ratio R and the ratio of the depression amount required for pressing the rod 24 by the certain amount are reduced in a range where the depressing stroke is large.

$$R = [(L_p \times M_2) / (M_1 \times L_H)] \times \cos \theta \dots\dots (1) --$$

#### IN THE CLAIMS:

Please AMEND the pending claims 1-3 and ADD new claims 4-8 in accordance with the following:

1. (ONCE AMENDED) A pedal device for a vehicle, comprising:
  - a depressable portion which is to be operationally depressed by a driver of the vehicle;
  - an output member pivotably supported by a supporting shaft provided in a bracket that is fixed to a body of the vehicle, such that said output member is pivoted about said supporting shaft when said depressable portion is operationally depressed, for thereby applying to a motive-power transmitting member an output corresponding to a depression force which is applied to said depressable portion;
  - a longitudinal adjustment device to move said depressable portion in a longitudinal direction of the body of the vehicle when said depressable portion is not being operationally depressed; and
  - a pedal-ratio varying mechanism disposed between said output member and said motive-power transmitting member, and capable of adjusting a pedal ratio of said pedal device.

2. (ONCE AMENDED) A pedal device according to claim 1, wherein said pedal-ratio varying mechanism includes:

a pivot lever supported by an attaching shaft parallel to said supporting shaft and provided in said bracket such that said pivot lever is pivotable about said attaching shaft, said pivot lever being connected to said motive-power transmitting member such that said pivot lever is pivotable relative to said motive-power transmitting member about a first connecting shaft parallel to said attaching shaft; and

a connecting link connected to said pivot lever such that said connecting link is pivotable relative to said pivot lever about a second connecting shaft parallel to said attaching shaft, said connecting link being connected to said output member such that said connecting link is pivotable relative to said output member about a third connecting shaft parallel to said second connecting shaft, and

wherein said depression force applied to said depressable portion is transmitted from said output member to said motive-power transmitting member via said connecting link and said pivot lever.

3. (ONCE AMENDED) A pedal device according to claim 1, wherein said longitudinal adjustment device includes:

an adjusting link supported by said supporting shaft such that said adjusting link is pivotable about said supporting shaft and is adjustably positioned in a predetermined pivoted position;

a pedal member connected to said adjusting link such that said pedal member is pivotable relative to said adjusting link about a fourth connecting shaft parallel to said supporting shaft, said pedal member having said depressable portion so that said pedal member is pivoted about said fourth connecting shaft when said depressable portion is operationally depressed; and

an interlock link connected to said pedal member such that said interlock link is pivotable relative to said pedal member about a fifth connecting shaft parallel to said supporting shaft, said interlock link being connected to said output member such that said interlock link is pivotable relative to said output member about a sixth connecting shaft parallel to said supporting shaft, said interlock link cooperating with said adjusting link to position said pedal member in a fixed posture, said interlock link being pivoted about said sixth connecting shaft when said adjusting link is pivoted, for thereby causing a circular motion of said pedal member in a longitudinal direction of the vehicle, said interlock link causing said output member to be pivoted about said supporting shaft when said pedal member is pivoted about said fourth connecting shaft with said depressable portion being operationally depressed and with said adjusting link being positioned in a predetermined pivoted position, and

wherein a line connecting said supporting shaft and said fourth connecting shaft, a line connecting said fourth connecting shaft and said fifth connecting shaft, a line connecting said fifth connecting shaft and said sixth connecting shaft and a line connecting said sixth shaft and said supporting shaft cooperate with each other to substantially define a parallelogram, so that said pedal member is substantially parallelly displaced when said adjusting link is pivoted about said supporting shaft.

4. (NEW) A pedal device according to claim 2, wherein said longitudinal adjustment device includes:

an adjusting link supported by said supporting shaft such that said adjusting link is pivotable about said supporting shaft and is adjustably positioned in a predetermined pivoted position;

a pedal member connected to said adjusting link such that said pedal member is pivotable relative to said adjusting link about a fourth connecting shaft parallel to said supporting shaft, said pedal member having said depressable portion so that said pedal member is pivoted about said fourth connecting shaft when said depressable portion is operationally depressed; and

an interlock link connected to said pedal member such that said interlock link is pivotable relative to said pedal member about a fifth connecting shaft parallel to said supporting shaft, said interlock link being connected to said output member such that said interlock link is pivotable relative to said output member about a sixth connecting shaft parallel to said supporting shaft, said interlock link cooperating with said adjusting link to position said pedal member in a fixed posture, said interlock link being pivoted about said sixth connecting shaft when said adjusting link is pivoted, for thereby causing a circular motion of said pedal member in a longitudinal direction of the vehicle, said interlock link causing said output member to be pivoted about said supporting shaft when said pedal member is pivoted about said fourth connecting shaft with said depressable portion being operationally depressed and with said adjusting link being positioned in a predetermined pivoted position, and

wherein a line connecting said supporting shaft and said fourth connecting shaft, a line connecting said fourth connecting shaft and said fifth connecting shaft, a line connecting said fifth connecting shaft and said sixth connecting shaft and a line connecting said sixth shaft and said supporting shaft cooperate with each other to substantially define a parallelogram, so that said pedal member is substantially parallelly displaced when said adjusting link is pivoted about said supporting shaft.

5. (NEW) A pedal device according to claim 1, wherein said pedal ratio is represented by a ratio of a depressing amount by which said depressable portion is depressed, to a displaced amount by which said motive-power transmitting member is displaced with said depressable portion being depressed by said depressing amount.

6. (NEW) A pedal device according to claim 1, wherein said pedal-ratio varying mechanism includes:

an intermediate lever supported by an attaching shaft parallel to said supporting shaft and provided in said bracket such that said intermediate lever is pivotable about said attaching shaft, said intermediate lever being connected to said motive-power transmitting member such that said intermediate lever is pivotable relative to said motive-power transmitting member about a connecting shaft parallel to said attaching shaft; and

an engagement device disposed between said intermediate lever and said output member, and which causes said intermediate lever to be pivoted when said output member is pivoted.

7. (NEW) A pedal device according to claim 6, wherein said engagement device includes:

a cam contact portion formed in said intermediate lever; and  
a cam roller provided in said output member and which is held in contact with said cam contact portion.

8. (NEW) A pedal device according to claim 1, wherein said longitudinal adjustment device includes:

an adjusting link supported by said supporting shaft such that said adjusting link is pivotable about said supporting shaft and is adjustably positioned in a predetermined pivoted position;

a pedal member connected to a lower end portion of said adjusting link such that said pedal member is pivotable relative to said adjusting link about a fourth connecting shaft parallel to said supporting shaft, said pedal member having said depressable portion, so that said pedal member is pivoted about said fourth connecting shaft when said depressable portion is operationally depressed; and

an interlock link connected at a lower end portion thereof to said pedal member such that said interlock link is pivotable relative to said pedal member about a fifth connecting shaft parallel to said supporting shaft and located rearwardly of said fourth connecting shaft, said interlock link being connected at an upper end portion thereof to said output member such that said interlock link is pivotable relative to said output member about a sixth connecting shaft parallel to said supporting shaft and located rearwardly of said supporting shaft, said interlock link cooperating with said adjusting link to position said pedal member in a fixed posture, said interlock link being pivoted about said sixth connecting shaft when said adjusting link is pivoted, for thereby causing a circular motion of said pedal member in a longitudinal direction of the vehicle, said interlock link causing said output member to be pivoted about said supporting shaft when said pedal member is pivoted about said fourth connecting shaft with said depressable portion being operationally depressed and with said adjusting link being positioned in a predetermined pivoted position, and

wherein a line connecting said supporting shaft and said fourth connecting shaft, a line connecting said fourth connecting shaft and said fifth connecting shaft, a line connecting said fifth connecting shaft and said sixth connecting shaft and a line connecting said sixth shaft and said supporting shaft cooperate with each other to substantially define a parallelogram, so that said pedal member is substantially parallelly displaced when said adjusting link is pivoted about said supporting shaft.

**REMARKS**

This Preliminary Amendment is submitted to improve the form of the specification as originally-filed. For example, the amendment in paragraph of the specification is made for simply correcting a typographical error, and is accordingly supported by the description of the specification. In addition, original claims 1-3 are slightly amended, and new claims 4-8 are added. No new matter is added.

It is respectfully requested that this Preliminary Amendment be entered in the above-referenced application.

If there are any additional fees associated with filing of this Preliminary Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date:

January 16, 2002

By:

David M. Pitcher

David M. Pitcher

Registration No. 25,908

700 Eleventh Street, NW, Suite 500  
Washington, D.C. 20001  
434-1500

**VERSION WITH MARKINGS TO SHOW CHANGES MADE****IN THE ABSTRACT:**

Please DELETE the Abstract in its entirety and substitute the attached new Abstract.

[To improve a degree of freedom in determination of a pedal ratio characteristic in a vehicle pedal device capable of adjusting the pedal position in a longitudinal direction of the vehicle, so that the improved degree of the freedom in the determination of the pedal ratio characteristic cooperates with the provision for adjusting the pedal position, to make it possible to obtain a further excellent pedal maneuverability.

A connecting link 60 and a pivot lever 62 are interposed between an output member 28 and a rod 24, so that an operational depression force applied to a depressable portion 20 is transmitted from the output member 28 to the rod 24 via the connecting link 60 and the pivot lever 62. Therefore, by suitably determining the posture and connecting position of the pivot lever 62, it is possible to easily vary the characteristic of the pedal ratio in relation with a depressing stroke, thereby increasing the degree of freedom in the determination of the pedal ratio characteristic. The increased degree of freedom in the determination of the pedal ratio characteristic cooperates with the provision for adjusting the position of the depressable portion 20 in the longitudinal direction of the vehicle, to remarkably improve the pedal maneuverability.]

--A vehicle pedal device including: a depressable portion which is to be operationally depressed by a driver of the vehicle; an output member which is pivotably supported by a supporting shaft provided in a bracket that is fixed to a body of the vehicle, such that the output member is pivoted about the supporting shaft when the depressable portion is operationally depressed, for thereby applying to a motive-power transmitting member an output corresponding to a depression force which is applied to the depressable portion; a longitudinal adjustment device for moving the depressable portion in a longitudinal direction of the body of the vehicle when the depressable portion is not being operationally depressed; and a pedal-ratio varying mechanism which is disposed between the output member and the motive-power transmitting member, and which is capable of adjusting a pedal ratio of the pedal device.--

**IN THE SPECIFICATION:**

Please REPLACE paragraph [0028] with the following paragraph:



**[0028]**

The above-described pedal ratio is a ratio at which the depression force is multiplied to press the rod 24, or a ratio of the depression amount required for pressing the rod 24 by a certain amount. The pedal ratio can be expressed by the following expression in which a dimension of each part indicated in Fig. 1 is used. In the expression, R represents the pedal ratio; the dimension  $L_p$  represents an arm length of the pedal member 34; the dimensions  $M_1$ ,  $M_2$  represent respective arm lengths of the output member 28 and the pivot lever 62 which are measured from the connecting link 60 as a reference; the dimension  $L_H$  represents an arm length from the attaching shaft 64 of the pivot lever 62 to a center line S at which the rod 24 is pressed into the brake booster; and the angle  $\theta$  represents an angle by which the rod 24 is inclined with respect to the center line S. Fig. 3 is one example of the characteristic of the pedal ratio R, which is obtained in accordance with the expression while the depressing stroke of the depressable portion 20, i.e., the position of the pedal member 34 about the connecting shaft 32 is successively changed. In this example of the characteristic of the pedal ratio R, the pedal ratio R and the ratio of the depression amount required for pressing the rod 24 by the certain amount are reduced in a range where the depressing stroke is large.

$$R = [(L_1 \times M_2) / (M_1 \times L_H)] \times \cos \theta \cdots \cdots (1)]$$

**--[0028]**

The above-described pedal ratio is a ratio at which the depression force is multiplied to press the rod 24, or a ratio of the depression amount required for pressing the rod 24 by a certain amount. The pedal ratio can be expressed by the following expression in which a dimension of each part indicated in Fig. 1 is used. In the expression, R represents the pedal ratio; the dimension  $L_p$  represents an arm length of the pedal member 34; the dimensions  $M_1$ ,  $M_2$  represent respective arm lengths of the output member 28 and the pivot lever 62 which are measured from the connecting link 60 as a reference; the dimension  $L_H$  represents an arm length from the attaching shaft 64 of the pivot lever 62 to a center line S at which the rod 24 is pressed into the brake booster; and the angle  $\theta$  represents an angle by which the rod 24 is inclined with respect to the center line S. Fig. 3 is one example of the characteristic of the pedal ratio R, which is obtained in accordance with the expression while the depressing stroke of the depressable portion 20, i.e., the position of the pedal member 34 about the connecting shaft 32 is successively changed. In this example of the characteristic of the pedal ratio R, the pedal ratio R and the ratio of the depression amount required for pressing the rod 24 by the certain amount are reduced in a range where the depressing stroke is large.

$$R = [(L_p \times M_2) / (M_1 \times L_H)] \times \cos \theta \cdots \cdots (1) \text{ -- --}$$

IN THE CLAIMS:

Please AMEND the following claims 1-3:

1. (ONCE AMENDED) A pedal device for a vehicle, comprising:

a depressable portion to be operationally depressed by a driver of the vehicle;  
an output member [which is] pivotably supported by a supporting shaft provided in a bracket that is fixed to a body of the vehicle, such that said output member is pivoted about said supporting shaft when said depressable portion is operationally depressed, for thereby applying to a motive-power transmitting member an output corresponding to a depression force which is applied to said depressable portion; [and]

a longitudinal adjustment device [for moving] to move said depressable portion in a longitudinal direction of the body of the vehicle when said depressable portion is not being operationally depressed;

[said pedal device being characterized by comprising:] and

a pedal-ratio varying mechanism [which is] disposed between said output member and said motive-power transmitting member, and [which is] capable of adjusting a pedal ratio of said pedal device.

2. (ONCE AMENDED) A pedal device according to claim 1, [characterized in that] wherein said pedal-ratio varying mechanism includes:

a pivot lever [which is] supported by an attaching shaft parallel to said supporting shaft and provided in said bracket such that said pivot lever is pivotable about said attaching shaft, said pivot lever being connected to said motive-power transmitting member such that said pivot lever is pivotable relative to said motive-power transmitting member about a first connecting shaft parallel to said attaching shaft; and

a connecting link [which is] connected to said pivot lever such that said connecting link is pivotable relative to said pivot lever about a second connecting shaft parallel to said attaching shaft, said connecting link being connected to said output member such that said connecting link is pivotable relative to said output member about a third connecting shaft parallel to said second connecting shaft, and

wherein said depression force applied to said depressable portion is transmitted from said output member to said motive-power transmitting member via said connecting link and said pivot lever.

3. (ONCE AMENDED) A pedal device according to claim 1 [or 2, characterized in that], wherein said longitudinal adjustment device includes:

an adjusting link [which is] supported by said supporting shaft such that said adjusting link is pivotable about said supporting shaft and is adjustably positioned in a predetermined pivoted position [by adjusting means] ;

a pedal member [which is] connected to said adjusting link such that said pedal member is pivotable relative to said adjusting link about a fourth connecting shaft parallel to said supporting shaft, said pedal member having said depressable portion so that said pedal member is pivoted about said fourth connecting shaft when said depressable portion is operationally depressed; and

an interlock link [which is] connected to said pedal member such that said interlock link is pivotable relative to said pedal member about a fifth connecting shaft parallel to said supporting shaft, said interlock link being connected to said output member such that said interlock link is pivotable relative to said output member about a sixth connecting shaft parallel to said supporting shaft, said interlock link cooperating with said adjusting link to position said pedal member in a fixed posture, said interlock link being pivoted about said sixth connecting shaft when said adjusting link is pivoted, for thereby causing a circular motion of said pedal member in a longitudinal direction of the vehicle, said interlock link causing said output member to be pivoted about said supporting shaft when said pedal member is pivoted about said fourth connecting shaft with said depressable portion being operationally depressed and with said adjusting link being positioned in a predetermined pivoted position[;] , and

wherein a line connecting said supporting shaft and said fourth connecting shaft, a line connecting said fourth connecting shaft and said fifth connecting shaft, a line connecting said fifth connecting shaft and said sixth connecting shaft and a line connecting said sixth shaft and said supporting shaft cooperate with each other to substantially define a parallelogram, so that said pedal member is substantially parallelly displaced when said adjusting link is pivoted about said supporting shaft.

Please ADD the following claims 4-8:

--4. (NEW) A pedal device according to claim 2, wherein said longitudinal adjustment device includes:

an adjusting link supported by said supporting shaft such that said adjusting link is pivotable about said supporting shaft and is adjustably positioned in a predetermined pivoted position ;

a pedal member connected to said adjusting link such that said pedal member is pivotable relative to said adjusting link about a fourth connecting shaft parallel to said supporting shaft, said pedal member having said depressable portion so that said pedal member is pivoted about said fourth connecting shaft when said depressable portion is operationally depressed; and

an interlock link connected to said pedal member such that said interlock link is pivotable relative to said pedal member about a fifth connecting shaft parallel to said supporting shaft, said interlock link being connected to said output member such that said interlock link is pivotable relative to said output member about a sixth connecting shaft parallel to said supporting shaft, said interlock link cooperating with said adjusting link to position said pedal member in a fixed posture, said interlock link being pivoted about said sixth connecting shaft when said adjusting link is pivoted, for thereby causing a circular motion of said pedal member in a longitudinal direction of the vehicle, said interlock link causing said output member to be pivoted about said supporting shaft when said pedal member is pivoted about said fourth connecting shaft with said depressable portion being operationally depressed and with said adjusting link being positioned in a predetermined pivoted position, and

wherein a line connecting said supporting shaft and said fourth connecting shaft, a line connecting said fourth connecting shaft and said fifth connecting shaft, a line connecting said fifth connecting shaft and said sixth connecting shaft and a line connecting said sixth shaft and said supporting shaft cooperate with each other to substantially define a parallelogram, so that said pedal member is substantially parallelly displaced when said adjusting link is pivoted about said supporting shaft.

5. (NEW) A pedal device according to claim 1, wherein said pedal ratio is represented by a ratio of a depressing amount by which said depressable portion is depressed, to a displaced amount by which said motive-power transmitting member is displaced with said depressable portion being depressed by said depressing amount.

6. (NEW) A pedal device according to claim 1, wherein said pedal-ratio varying mechanism includes:

an intermediate lever supported by an attaching shaft parallel to said supporting shaft and provided in said bracket such that said intermediate lever is pivotable about said attaching shaft, said intermediate lever being connected to said motive-power transmitting member such that said intermediate lever is pivotable relative to said motive-power transmitting member about a connecting shaft parallel to said attaching shaft; and

an engagement device disposed between said intermediate lever and said output member, and which causes said intermediate lever to be pivoted when said output member is pivoted.

7. (NEW) A pedal device according to claim 6, wherein said engagement device includes:

a cam contact portion formed in said intermediate lever; and

a cam roller provided in said output member and held in contact with said cam contact portion.

8. (NEW) A pedal device according to claim 1, wherein said longitudinal adjustment device includes:

an adjusting link supported by said supporting shaft such that said adjusting link is pivotable about said supporting shaft and is adjustably positioned in a predetermined pivoted position;

a pedal member connected to a lower end portion of said adjusting link such that said pedal member is pivotable relative to said adjusting link about a fourth connecting shaft parallel to said supporting shaft, said pedal member having said depressable portion, so that said pedal member is pivoted about said fourth connecting shaft when said depressable portion is operationally depressed; and

an interlock link connected at a lower end portion thereof to said pedal member such that said interlock link is pivotable relative to said pedal member about a fifth connecting shaft parallel to said supporting shaft and located rearwardly of said fourth connecting shaft, said interlock link being connected at an upper end portion thereof to said output member such that said interlock link is pivotable relative to said output member about a sixth connecting shaft parallel to said supporting shaft and located rearwardly of said supporting shaft, said interlock link cooperating with said adjusting link to position said pedal member in a fixed posture, said interlock link being pivoted about said sixth connecting shaft when said adjusting link is pivoted, for thereby causing a circular motion of said pedal member in a longitudinal direction of the vehicle, said interlock link causing said output member to be pivoted about said supporting shaft when said pedal member is pivoted about said fourth connecting shaft with said depressable portion being operationally depressed and with said adjusting link being positioned in a predetermined pivoted position, and

wherein a line connecting said supporting shaft and said fourth connecting shaft, a line connecting said fourth connecting shaft and said fifth connecting shaft, a line connecting said fifth connecting shaft and said sixth connecting shaft and a line connecting said sixth shaft and said supporting shaft cooperate with each other to substantially define a parallelogram, so that said pedal member is substantially parallelly displaced when said adjusting link is pivoted about said supporting shaft.--



## TRANSLATOR'S CERTIFICATION

I, Akira HIRAKO, a citizen of Japan, residing at 1-41 Monzen-cho, Naka-ku, Nagoya-Shi, Japan, do solemnly and sincerely declare:

1. That I am well acquainted with both the English and Japanese languages, and

2. That the attached document is a true and accurate translation of the Japanese-language U.S. Patent Application filed October 16, 2001 with serial number 09/977,248.

AND I make this declaration conscientiously believing the statement contained herein to be true in every particular.

18th day of December, 2001

  
Akira Hirako